

## HINGE ASSEMBLY FOR UTILITY VEHICLE HOOD

### Technical Field of the Invention

This invention pertains to a hinge assembly for hinging a hood on a body  
5 of a utility vehicle, such as a tractor of a type that can be selectively equipped  
with a loader having a bucket or with a backhoe. The hinge assembly, which  
comprises a double-rocker, four-link mechanism, can be advantageously  
employed for hinging a hood near its back end, so that the hood can open  
upwardly and backwardly without interfering with adjacent structures of the utility  
10 vehicle.

### Background of the Invention

In a utility vehicle of the type noted above, the hood must be hinged on  
the body of the utility vehicle, whether on a cooling system compartment of the  
15 body or elsewhere, so that the hood can open without interfering with other parts  
of the utility vehicle.

Commonly, as exemplified in United States Patent No. 5,136,752, United  
States Patent No. 5,645,133, and United States Patent No. 6,213,235, the hood  
is hinged near its front end, so that the hood can open upwardly and frontwardly  
20 without interfering with adjacent structures of the utility vehicle.

A need has been ascertained, to which this invention is addressed, for a  
hinge assembly hinging the hood near its back end, so that the hood can open  
upwardly and backwardly without interfering with adjacent structures of the utility  
vehicle.

## Summary of th Invention

This invention provides a hinge assembly addressing the need noted above and comprising a double-rocker, four-link mechanism, which includes a  
5 bracket mounted to an underside of the hood, near a back end of the hood, a lower, fixed link having two opposite ends, each defined by a bracket mounted to the utility vehicle body, an upper, coupler link defined by a portion of the bracket and having two opposite ends, and two rocker links. Each rocker link has a lower end, which is connected to one of the opposite ends of the fixed link  
10 at a pivot, and an upper end, which is connected to one of the opposite ends of the coupler link at a pivot.

Preferably, the rocker links are comprised of a comparatively longer, front link and a comparatively shorter, back link, the coupler link being the shortest link. Preferably, the front, back, and coupler links are displaceable so that the  
15 upper end of the back link is movable toward and away from the lower end of the front link, between positions on opposite sides of a center line drawn between the lower end of the back link and the other end of the coupler link.

Preferably, an extensible-retractable spring is connected between the rocker links, the spring biasing the upper end of the back link toward the lower  
20 end of the front link. Preferably, the spring has a front end connected pivotally to the front link and a back end connected pivotally to the back link and, as measured along the front and back links respectively, the front end of the spring is comparatively closer to the lower end of the front link and the back end of the spring is comparatively farther from the lower end of the back link.

Preferably, the bracket is made from steel, the hood is made from vacuum-formed polypropylene, and the bracket is secured adhesively to the underside of the hood, as via an adhesive tape.

These and other objects, features, and advantages of this invention are  
5 evident from the following description of a preferred embodiment of this invention, with reference to the accompanying drawings.

### **Brief Description of the Drawings**

Figure 1 is a fragmentary, perspective view of a tractor having an engine  
10 compartment, a hood, which is shown in an opened condition, and a hinge assembly, which hinges the hood to the engine compartment, at a rear portion of the hood.

Figure 2 is a fragmentary, side elevation of the tractor, substantially as shown in Figure 1.

15 Figure 3 is a view substantially similar to Figure 2, except that the hood is shown in a closed condition.

### **Detailed Description of the Preferred Embodiment**

While the present invention is susceptible of embodiment in various  
20 forms, there is shown in the drawings, and will hereinafter be described, a presently preferred embodiment, with the understanding that the present disclosure is to be considered as an exemplification of the invention, and is not intended to limit the invention to the specific embodiment illustrated.

As shown, a tractor 10 has a body 12, which includes an engine compartment having a firewall 13, two side walls 14, a hood 16, which is hinged to the firewall 13 near the back end 18 of the hood 16, and a hinge assembly 20 constituting a preferred embodiment of this invention. A bracket 32 is mounted to an underside 22 of the hood 16 and extends across a region near the back end 18 of the hood 16. The hinge assembly 20, which comprises a double-rocker, four-link mechanism 30, enables the hood 16 to open upwardly and backwardly from a closed position into an opened position without interfering with adjacent structures of the tractor 10.

As shown, the hood 16 is made from a polymeric material, vacuum-formed polypropylene being a preferred material. This material provides the hood with an aesthetically pleasing, extremely smooth, paintable or pre-colored surface. As shown, the bracket 32 is made from steel, which may be desirably painted or galvanized or which may be stainless steel, and which is secured adhesively to the underside 22 of the hood 16, preferably by 3M VHB Model No. 4611 Tape, which is available commercially from Minnesota Mining and Manufacturing Company of St. Paul, Minnesota. Advantageously, therefore, it is not necessary to use bolts, rivets, or other mechanical fasteners to secure the bracket 32 to the underside of the hood 16.

The mechanism 30, which is mounted near one side of the tractor 10, includes a lower, fixed link 34, which has two opposite ends, *i.e.*, a front end 36 and a back end 38, each being defined by a bracket 42 mounted to the firewall 13 and the forward attaching bracket 40. The bracket 40 defining the front end 36 and the bracket 42 defining the back end 38 are shown in Figure 2.

The mechanism 30 further includes an upper, coupler link 50, which is defined by a portion of the hood-mounted bracket 32, at the same side of the tractor 10. The coupler link 50 has two opposite ends, *i.e.*, a front end 52 and a back end 54. The mechanism 30 further includes two rocker links, *i.e.*, a  
5 comparatively longer, front link 56 and a comparatively shorter, back link 58.

The front link 56 has a lower end 60, which is connected pivotally to the front end 36 of the fixed link 34, and an upper end 62, which is connected pivotally to the front end 52 of the coupler link 50. The back link 58 has a lower end 64, which is connected pivotally to the back end 38 of the fixed link 34, and  
10 an upper end 66, which is connected pivotally to the back end 54 of the coupler link 50.

The front link 56, the back link 58, and the coupler link 50 are displaceable so that the upper end 66 of the back link 58 and the back end 54 of the coupler link 50, where connected pivotally, are movable toward and away  
15 from the lower end 60 of the front link 56, between positions on opposite sides of a centerline drawn between the lower end 64 of the back link 58 and the front end 52 of the coupler link 50.

An extensible-retractable, coiled spring 80 has a front end 82, which is connected to the front link 56, at a connection 84 between the lower end 60 of  
20 the front link 56 and its upper end 66. The spring 80 has a back end 86, which is connected pivotally to the back link 58, at a connection 88 between the lower end 54 of the back link 58 and its upper end 66. In the drawings, for illustrative purposes, the back end 86 of the spring 80 and the connection 88 are shown as disconnected. As measured along the front link 56 and the back link 58

respectively, the front end 82 of the spring 80 is comparatively closer to the lower end 60 of the front link 56 and the back end 86 of the spring 80 is comparatively farther from the lower end 64 of the back link 58.

Thus, the spring 80 is connected so as to bias the upper end 66 of the back link 58 toward the lower end 60 of the front link 56, so as to bias the hood 16 toward the closed position when the upper end 66 of the back link 58 is in back of the centerline noted above, and so as to bias the hood 16 toward the opened position when the upper end 66 of the back link 58 is in front of the centerline noted above. The hood 16 is biased into the closed position, in which the hood rests on the cooling system compartment 16, not only by the spring 80 but also gravitationally. As shown in Figure 1, the bracket 32 mounts a spring clamp 90, which is adapted to clamp the front link 56 releasably, so as to clamp the hood 16 releasably in the opened position.

Near the other side of the tractor 10, a back link 92, which is similar to the back link 58, has a lower end 94, which is connected pivotally to the firewall 13, via a bracket 96, and an upper end (not shown) which is connected pivotally to the bracket 32. The back link 92 averts binding or warping of the hood 16 as the hood 16 moves between its closed and opened positions.

From the foregoing, it will be observed that numerous modifications and variations can be effected without departing from the true spirit and scope of the novel concept of the present invention. It is to be understood that no limitation with respect to the specific embodiment illustrated herein is intended or should be inferred. The disclosure is intended to cover, by the appended claims, all such modifications as fall within the scope of the claims.